ALIGNMENT PROCEDURE

MODEL: 150GTL
REVISION: 1.1
DATE: 02/14/06

PREPARED BY: BURKE

Total Pages: 6 pages

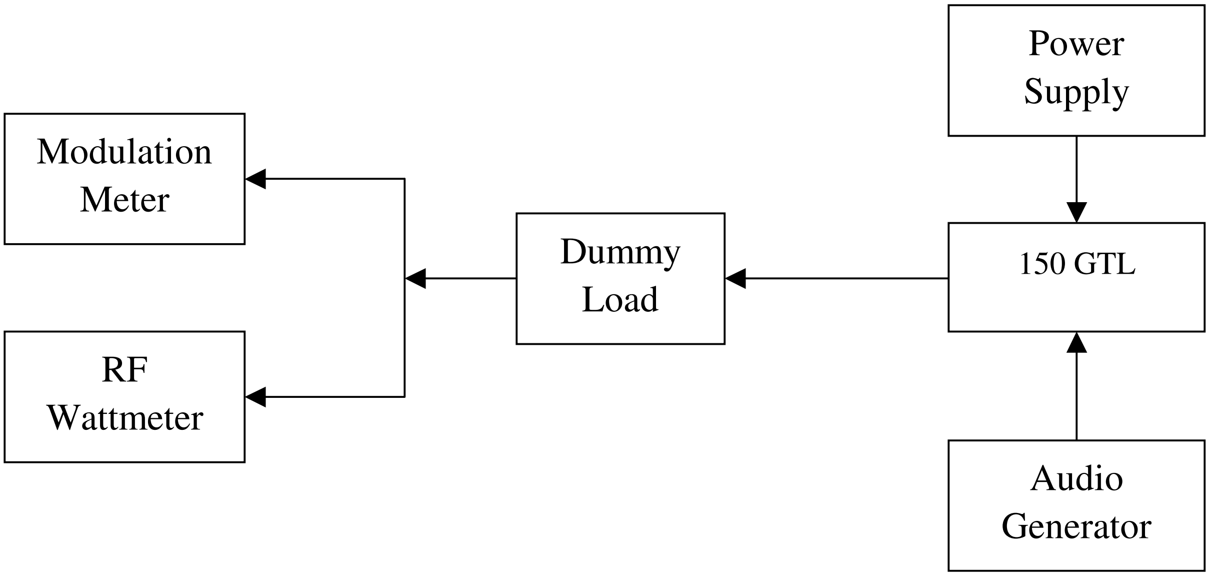
150GTL ALIGNMENT INSTRUCTION

1 TEST CONDITION:

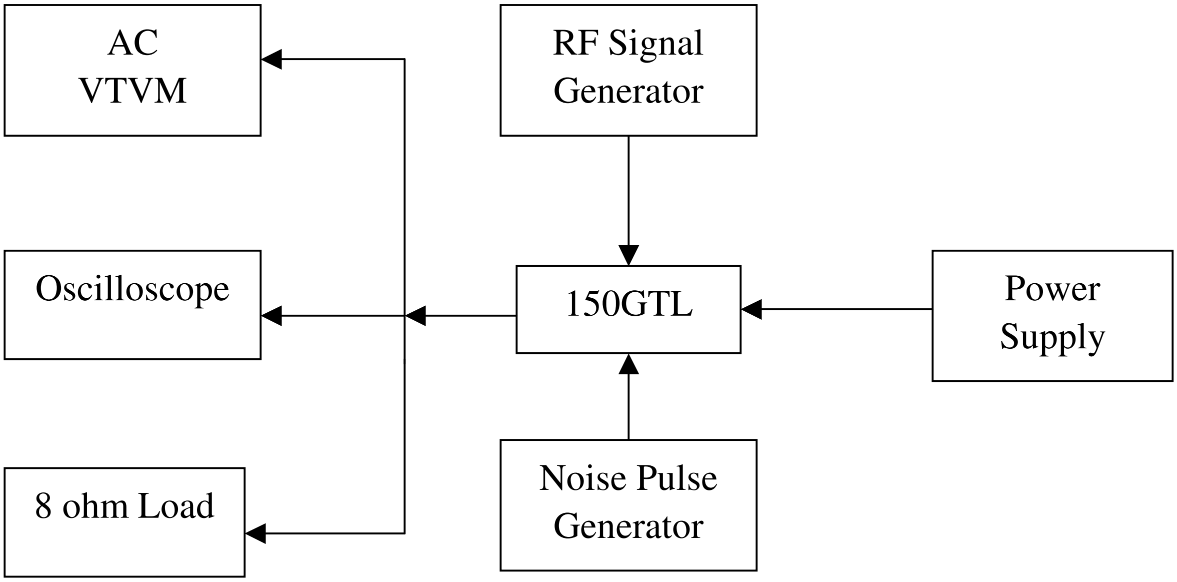
1.0. TEST TEMPERTAURE:	77 ±9 °F
1.1. STANDARD DC POWER:	13.8VDC
1.2. STANDARD AUDIO LOADING:	8 Ω
1.3. ANTENNA IMPEDANCE:	50 Ω
1.4. STANDARD REF. MODULATION:	AM 30%
	FM 2.5KHz
1.5. PULSE GENERATOR:	1µS pulse @ 100mS and 1V peak-to-peak amplitude, with rise and fall time of less than 10nS.

1.6. TEST EQUIPMENT SETUP AS BELOW:

A. TX test equipment setup:



B. RX test equipment setup:



2.0 MAIN ALIGNMENT

2.1 PLL Alignment

STEP	PRESET TO	CONNECTIONS	ADJUST	PROCEDURE
1	RX mode, AM, 28.000MHz	Oscilloscope to TP1	T712	Check for range of 0.2 to 7VDC, then set to 2.8V
2	Change to Band D	Oscilloscope to TP1		DC level should be < 6V
3	Same as step 1	Oscilloscope to TP2	T713	Adjust for maximum output
4	Same as step 1	Oscilloscope to 4th test point of CON2	T717	Adjust for maximum output
5	Same as step 1	Frequency counter to TP3	CT1	Adjust for 17.305MHz (frequency – 10.695)

2.2 Carrier Alignment

STEP	PRESET TO	CONNECTIONS	ADJUST	PROCEDURE
1	TX mode, AM, 28.000MHz	Frequency counter to TP3	CT2	Adjust for 28.000MHz

3.0 RECEIVER ALIGNMENT

Connect an AC VTVM with 8 ohm load across speaker coil.
Adjust volume control to obtain a suitable indication.
Set generator output low enough to prevent AGC limiting.
Preset controls as follows, unless otherwise noted:
RF Gain maximum, **Squelch** minimum, **NB**/**ANL** off.

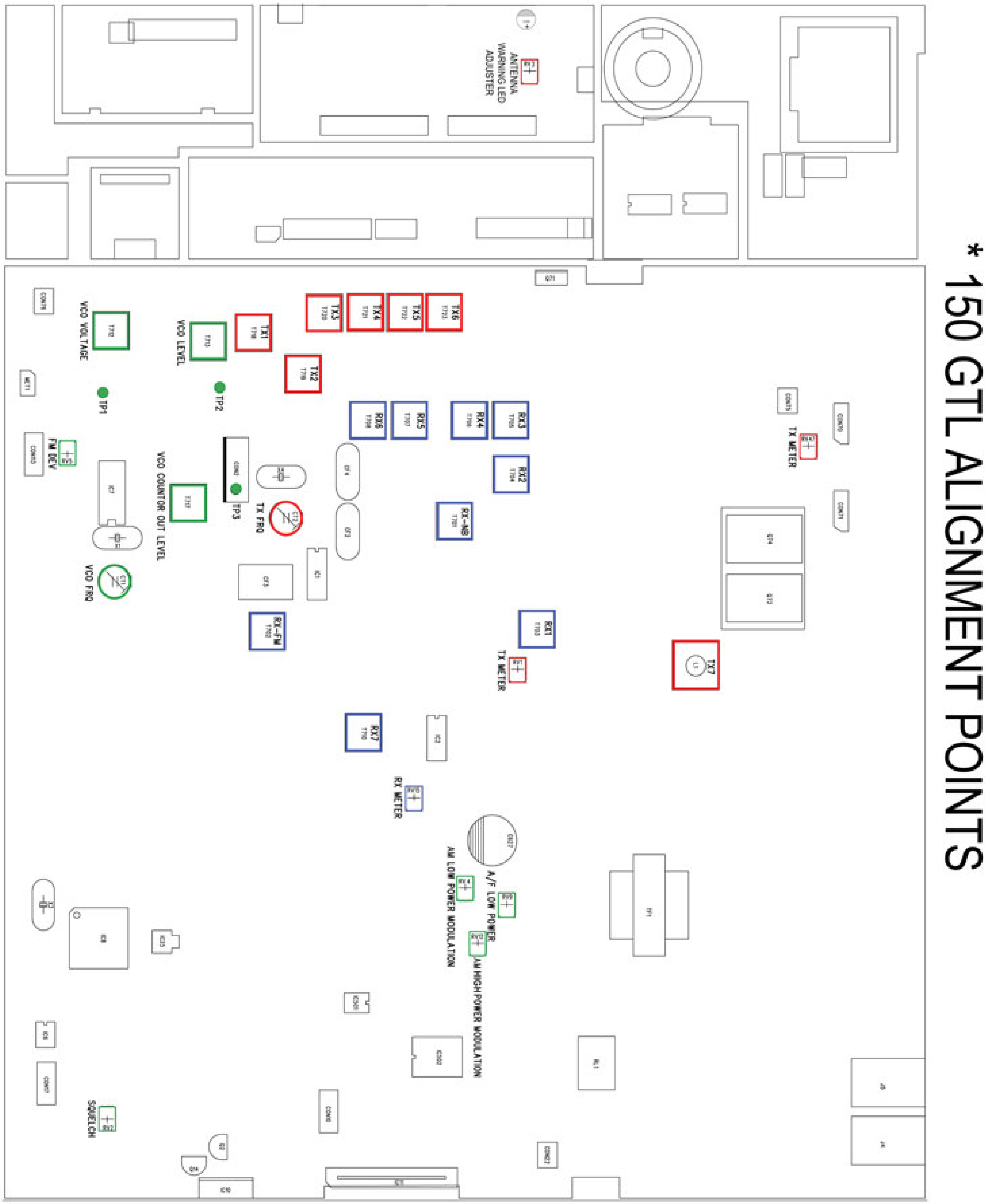
STEP	PRESET TO	CONNECTIONS	ADJUST	PROCEDURE
1	RX mode, AM 28.000MHz	Output of signal generator to antenna connector. Freq. = 28.000MHz, 1KHz 30% modulation, RF output 1µV	T703, T704, T705, T706, T707, T708, T710	Adjust for maximum signal on VTVM
2	Same as step 1, squelch to maximum	Output of signal generator to antenna connector. Freq. = 28.000MHz, 1KHz 30% modulation, RF output 1500µV	RV2	SQUELCH RANGE Adjust just until squelch opens
3	Same as step 1	Output of signal generator to antenna connector. Freq. = 28.000MHz, NO modulation, RF output 100µV	RV15	SIGNAL METER Adjust for a reading of S-9 on the analog meter of the radio
4	RX mode, AM, 28.000MHz, NB/ANL switch set to NB/ANL	Output of signal generator and noise pulse generator to antenna connector. Freq. = 28.000MHz, 1KHz 30% modulation, RF output 1µV. Oscilloscope to collector of Q6	T701	NOISE BLANKER Adjust for maximum amplitude on oscilloscope
5	RX mode, FM, 28.000MHz	Output of signal generator to antenna connector. Freq. = 28.000MHz, 2.5KHz deviation, RF output 1µV	T702	Adjust for maximum signal on VTVM

4.0 TRANSMITTER ALIGNMENT

Maintain a 50 ohm 25 watt dummy load on the antenna connector for the following steps.
Preset controls as follows, unless otherwise noted:
RF Power set to HI, **Mic Gain** to minimum.

STEP	PRESET TO	CONNECTIONS	ADJUST	PROCEDURE
1	TX mode, AM, 29.700MHz	RF wattmeter to antenna connector	T718, T719, T720, T721, T722, T723	Adjust for maximum RF output
2	Same as step 1	Same as step 1	L21	RF POWER - HI Adjust for 13-17 watts on all bands
3	Same as step 1, Power switch to LO	Same as step 1	RV9	RF POWER - LO Adjust for 4 watts

STEP	PRESET TO	CONNECTIONS	ADJUST	PROCEDURE
4	TX mode, AM, 29.700MHz		RV1	RF POWER METER Adjust for a reading of S-9 on the analog meter of the radio
5	TX mode, AM, 29.700MHz Mic Gain to maximum	Modulation meter to antenna connector. Insert a 1KHz, 30mV signal to microphone input.	RV12	AMC CONTROL - HI Adjust for 90% modulation on all bands
6	Same as step 5, Power switch to LO	Same as step 5	RV4	AMC CONTROL - LO Adjust for 90% modulation on all bands
7	TX mode, FM, 29.700MHz Mic Gain to maximum	Same as step 5	RV5	DEVIATION LIMITER Adjust for 2.5KHz deviation
8	TX mode, AM, Power switch to LO, Mic Gain to minimum, S/RF switch set to CAL	Connect a 100 ohm non-inductive dummy load to the antenna connector	RV17	SWR METER Adjust SWR Cal knob so analog meter on radio goes to CAL mark. Then set S/RF switch to SWR and adjust RV17 for an SWR reading of 2 on the analog meter of the radio.
9	TX mode, AM, Power switch to LO, Mic Gain to minimum	Short the antenna output to ground	RV3 (located on back of front panel)	ANTENNA LIGHT Adjust RV3 just until the antenna light comes on

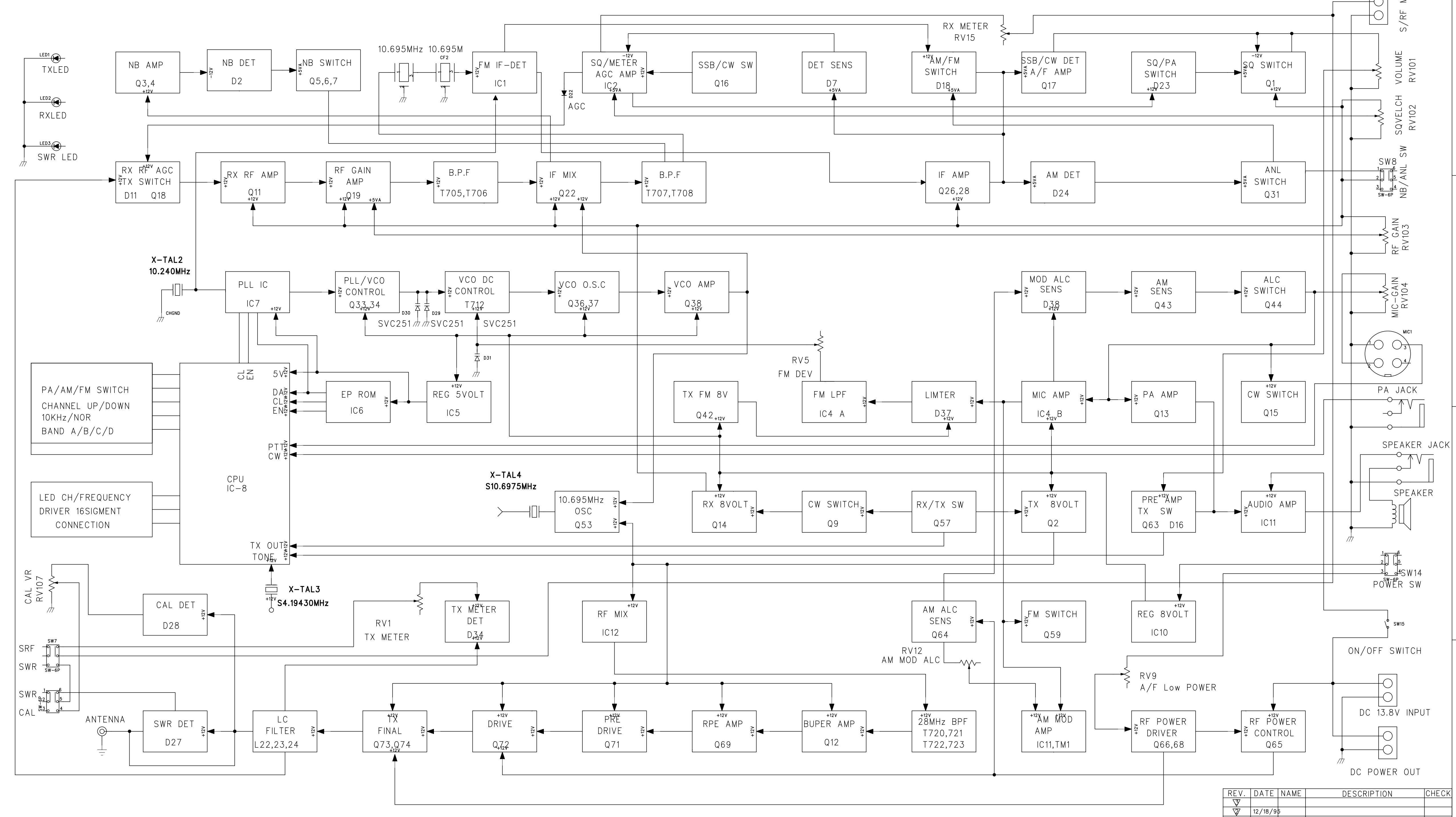

* 150 GTL ALIGNMENT POINTS
ANTENNA WARNING LED ADJUSTER
VCO VOLTAGE
VCO LEVEL
TX1
TX2
TX3
TX4
TX5
TX6
TX7
TP1
TP2
TP3
RX1
RX2
RX3
RX4
RX5
RX6
RX7
RX-NB
RX-FM
FM DEV
VCO COUNTOR OUT LEVEL
TX FRQ
VCO FRQ
TX METER
TX METER
RX METER
A/F LOW POWER
AM LOW POWER MODULATION
AM HIGH POWER MODULATION
SQUELCH

REVISION HISTORY

1.0 – Initial release

1.1 – Added section Step 9 in Section 4

BLOCK DIAGRAM



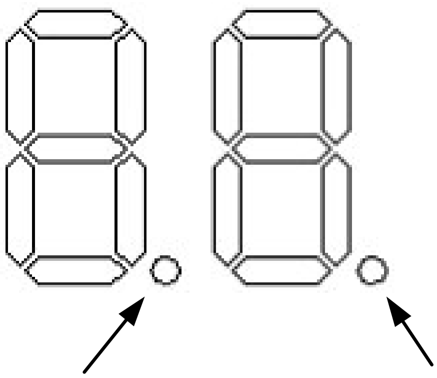
REV.	DATE	NAME	DESCRIPTION	CHECK
▽				
▽	12/18/95			
▽	10/26/95			
UNIT	SCALS :	SHEET OF	BUYER NAME :	
DRW.	CHK.	APP.	MODEL NAME :	
K.A.JUNG 95/04/13			DRAWING NO. :	

150GTL Channel Display

The 150GTL has 4 bands which cover frequencies from 28.000 to 29.700 MHz in 5KHz steps. The dual seven-segment channel display indicates the operating frequency.

BAND	FREQUENCY RANGE	CHANNEL DISPLAY RANGE
A	28.000 to 28.495	00 to 49.
B	28.500 to 28.995	50 to 99.
C	29.000 to 29.495	0.0 to 4.9.
D	29.500 to 29.700	5.0 to 7.0

You must be careful to note the decimal points!



This decimal point
shows the MHz band.

OFF = 28.xxx MHz
ON = 29.xxx MHz

This decimal point
shows the last digit.

OFF = xx.xx0 MHz
ON = xx.xx5 MHz

x x . x x x MHz

These two digits are determined by the status of the decimal between the channel numbers.

Decimal OFF = 28
Decimal ON = 29

These two digits are taken directly from the channel display.

The last digit is determined by the status of the far-right decimal point.

Decimal OFF = 0
Decimal ON = 5

SUPPLY VOLTAGE: 13.8 V

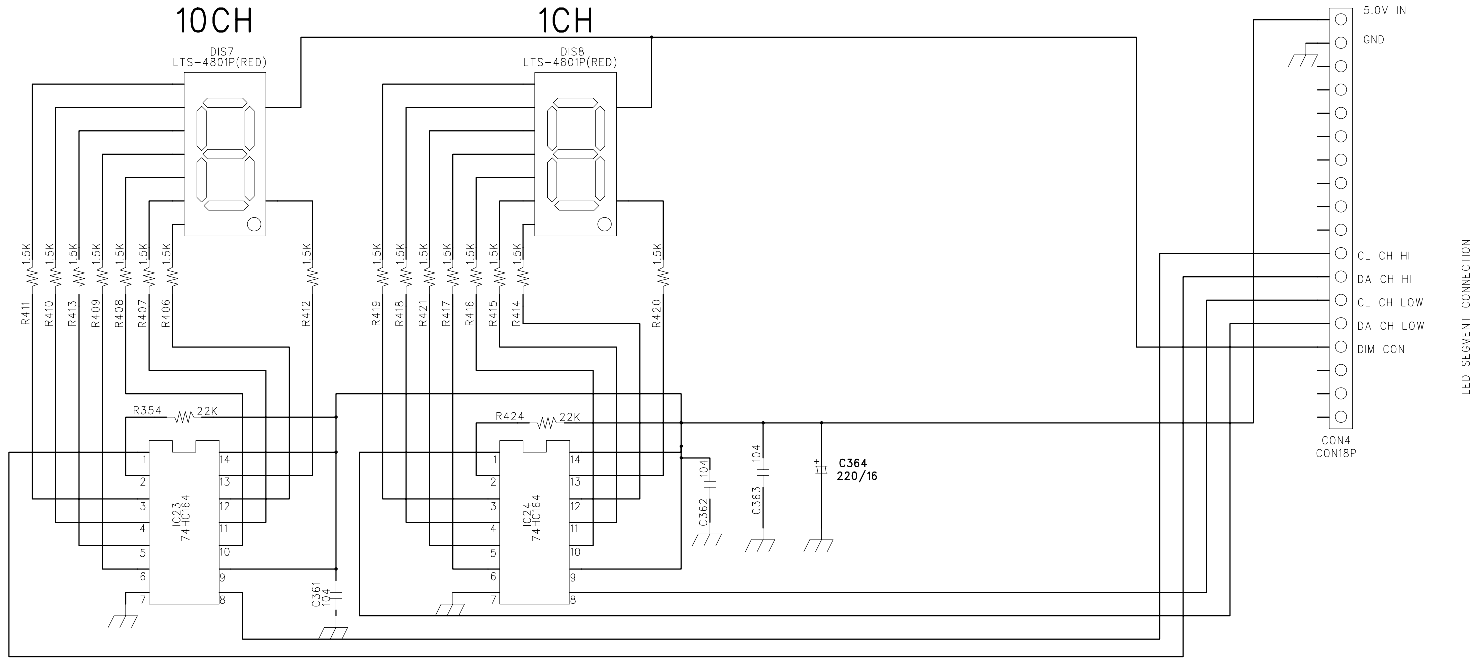
BAND A (28.000 MHz)

RX TESTING

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	GROUND	V	0	0	0
2	RX/TX	V	2.31	2.31	2.31
3	RX/TX	V	2	2	2
4	RX/TX	V	4.9	4.9	4.9
5	NO CONNECTION		N.C.	N.C.	N.C.
6	NO CONNECTION		N.C.	N.C.	N.C.
7	GROUND	V	0	0	0
8	NO CONNECTION		N.C.	N.C.	N.C.
9	DURING STANDBY	V	0	0	0
	WHEN CH. SW. TURN ON TO DOWN POSITION	V	4.7	4.7	4.7
10	RX/TX	V	4.9	4.9	4.9
11	RX/TX	V	0.44	0.44	0.44
12	DURING STANDBY	V	0	0	0
13	RX/TX	V	4.9	4.9	4.9
14	RX/TX	V	4.86	4.86	4.86
15	RX/TX	mV	3.5	3.5	3.5
16	RX/TX	mV	3.7	3.7	3.7
17	NO CONNECTION		N.C.	N.C.	N.C.
18	DURING STANDBY	V	0	0	0
	WHEN CH. SW. TURN ON TO UP POSITION	V	4.7	4.7	4.7
19	STANDBY	V	0	0	0
20	RX/TX	mV	7.4	7.4	7.4
21	RX	mV	4.2	4.2	4.2
	TX	mV	5.1	5.1	5.1
22	RX MODE /10 KHZ SW. ON	V	4.8	4.8	4.8
	TX MODE /10 KHZ SW. ON	V	3	3	3
23	RX OPERATION	V	4.9	4.9	4.9
	TX OPERATION	V	0.45	0.45	0.45
24	RX OPERATION	mV	4.6	4.6	4.6
	TX OPERATION	V	4.6mV	4.8	4.8
25	RX	V	5	5	5
	TX	mV	5V	40.2	40.2
26	RX	mV	28	28	28
	TX	mV	28	29.2	29.2
27	NO CONNECTION		N.C.	N.C.	N.C.
28	RX/TX OPERATION	V	0	0	0
29	RX/TX OPERATION	V	4.96	4.96	4.96
30	BAND SWITCH SET TO A BAND / WHEN SET TO OTHER BAND PIN IS EQUAL TO ZERO VOLT	V	4.75	4.75	4.75
31	BAND SWITCH SET TO B BAND / WHEN SET TO OTHER BAND PIN IS EQUAL TO ZERO VOLT	V	4.75	4.75	4.75
32	BAND SWITCH SET TO C BAND / WHEN SET TO OTHER BAND PIN IS EQUAL TO ZERO VOLT	V	4.75	4.75	4.75
33	BAND SWITCH SET TO D BAND / WHEN SET TO OTHER BAND PIN IS EQUAL TO ZERO VOLT	V	4.75	4.75	4.75
34	MODE SW. SET TO P.A. FUNCTION	mV	4.7V	2	2
35	RX/TX OPERATION	V	5	5	5
36	RX/TX OPERATION	V	4.6	4.6	4.6
37	NO CONNECTION		N.C.	N.C.	N.C.
38	RX OPERATION	mV	173	173	173
	TX OPERATION	mV	173	172	172
39	RX/TX OPERATION	V	4.2	4.2	4.2
40	RX/TX OPERATION	V	4.83	4.83	4.83
41	RX/TX OPERATION	V	0	0	0
42	RX/TX OPERATION	V	0	0	0
43	PIN 43-56 NO CONNECTION		N.C.	N.C.	N.C.
57	RX	mV	40	40	40
	TX	mV	41	41	41
58	RX	mV	40	40	40
59	TX	mV	41	41	41
60	RX/TX OPERATION	V	0	0	0

NOTE: PIN 61 - 80 NO CONNECTION

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



DRAWN:	DATED:
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

COMPANY:

TITLE:

CODE:	SIZE:	DRAWING NO:	REV:

SCALE:

SHEET: OF

TEST CONDITION:
SUPPLY VOLTAGE: 13.8 V
BAND A (28.000 MHz)

IC 502 (HT8970)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	TX OPERATION	V	6.13	5.86	5.86
2	TX OPERATION	V	3.5	2.9	2.9
3	GROUND	V	0	0	0
4	GROUND	V	0	0	0
5	TX OPERATION	V	3.4	3.25	3.24
6	TX OPERATION	V	3.06	2.9	2.9
7	TX OPERATION W/ MODULATION	V	0.78	3	3
8	TX OPERATION W/ MODULATION	V	0.79	3	3
9	TX OPERATION	V	3.1	2.9	2.9
10	TX OPERATION	V	3.06	2.9	2.9
11	TX OPERATION	V	3.06	2.9	2.9
12	TX OPERATION	V	3.09	2.9	2.9
13	TX OPERATION	V	3.05	2.9	2.9
14	TX OPERATION	V	3.06	2.9	2.9
15	TX OPERATION	V	3.08	2.9	2.9
16	TX OPERATION	V	3.06	2.9	2.9

IC 9 (TDA 2003V)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	VOL. MIN	V	1.38	1.38	1.38
	VOL.MAX.	V	1.28	1.28	1.28
2	VOL. MIN	V	0.82	0.82	0.82
	VOL.MAX.	V	0.64	0.69	0.69
3	GROUND	V	0	0	0
4	VOL. MIN	V	6.42	6.42	6.42
	VOL.MAX.	V	6.18	6.18	6.18
5	SUPPLY VOLTAGE	V	13.7	13.7	13.7

IC 26 (KIA 6058 F)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	TX	V	0	1.08	1.08
2	TX	V	0.03	1.77	1.77
3	TX	V	0	6.9	6.9
4	TX	V	0.04	1.74	1.74
5	GROUND	V	0	0	0
6	TX	V	0	6.8	6.8
7	TX	V	0	6.86	6.85
8	TX	V	0	6.9	6.9

IC 11 (TDA- 2005)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX/TX	V	1.3	1.3	1.3
2	RX/TX	V	0.76	0.76	0.76
3	RX	V	8.47	8.47	8.47
	TX MODE W/ MODULATION	V	8.47	7.8	8.3
4	RX/TX	V	0.73	0.71	0.72
5	TX	V	1.32	1.23	1.3
6	GROUND	V	0	0	0
7	RX	V	13.2	13.2	13.2
	TX MODE W/O MODULATION	V	13.27	12.9	13
	TX MODE W/ MODULATION	V	13.27	11.8	12.9
8	RX	V	7	7	7
	TX MODE W/O MODULATION	V	7	6.85	6.85
	TX MODE W/ MODULATION	V	7	6.5	6.85
9	RX	V	13.7	13.7	13.7
	TX MODE W/O MODULATION	V	13.7	13.4	13.4
	TX MODE W/ MODULATION	V	13.7	12.5	13.4
10	RX	V	7	7	7
	TX MODE W/O MODULATION	V	7	6.8	6.8
	TX MODE W/ MODULATION	V	7	6.5	6.8

IC 4 (4558F)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX/TX	V	4	4	4
2	RX/TX	V	4	4	4
3	RX/TX	V	4	4	4
4	GROUND	V	0	0	0
5	RX/TX	V	3.72	3.74	3.71
6	RX/TX	V	3.75	3.76	3.75
7	RX/TX	V	3.75	3.76	3.75
8	SUPPLY VOLTAGE	V	7.5	7.5	7.5

IC 501 (4558F)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX/TX	V	3.9	3.9	3.9
2	RX/TX	V	3.9	3.9	3.9
3	RX/TX	V	3.8	3.8	3.8
4	GROUND	V	0	0	0
	PIN # 5-7 NO CONNECTION		N.C.	N.C.	N.C.
8	SUPPLY VOLTAGE	V	7.76	7.76	7.76

IC 7 (LC7152)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX/TX	V	2.1	2.1	2.1
2	RX	mV	3.9	3.9	3.9
	TX	mV	3.9	4.5	4.5
3	RX	mV	3.5	3.5	3.5
	TX	mV	3.5	4.1	4.1
4	RX	mV	35.8	35.8	35.8
	TX	mV	35.8	36.5	36.4
5	NO CONNECTION		N.C.	N.C.	N.C.
6	NO CONNECTION		N.C.	N.C.	N.C.
7	NO CONNECTION		N.C.	N.C.	N.C.
8	GROUND	V	0	0	0
9	MODE SW. SET TO BAND A	V	1	1	1
	MODE SW. SET TO BAND B	V	0.95	0.95	0.95
	MODE SW. SET TO BAND C	V	0.9	0.9	0.9
	MODE SW. SET TO BAND D	V	0.85	0.85	0.85
10	MODE SW. SET TO BAND A	V	1	1	1
	MODE SW. SET TO BAND B	V	0.95	0.95	0.95
	MODE SW. SET TO BAND C	V	0.9	0.9	0.9
	MODE SW. SET TO BAND D	V	0.85	0.85	0.85
11	MODE SW. SET TO BAND A	V	1	1	1
	MODE SW. SET TO BAND B	V	0.95	0.95	0.95
	MODE SW. SET TO BAND C	V	0.9	0.9	0.9
	MODE SW. SET TO BAND D	V	0.85	0.85	0.85
12	MODE SW. SET TO BAND A	V	2.8	2.8	2.8
	MODE SW. SET TO BAND B	V	4	4	4
	MODE SW. SET TO BAND C	V	4.9	4.9	4.9
	MODE SW. SET TO BAND D	V	5.6	5.6	5.6
13	NO CONNECTION		N.C.	N.C.	N.C.
14	RX/TX	V	2.4	2.4	2.4
15	GROUND	V	0	0	0
16	NO CONNECTION		N.C.	N.C.	N.C.
17	RX/TX	V	4.8	4.8	4.8
	PIN 18-23 NO CONNECTION		N.C.	N.C.	N.C.
24	RX/TX	V	2.2	2.2	2.2

IC 6 (24C02)

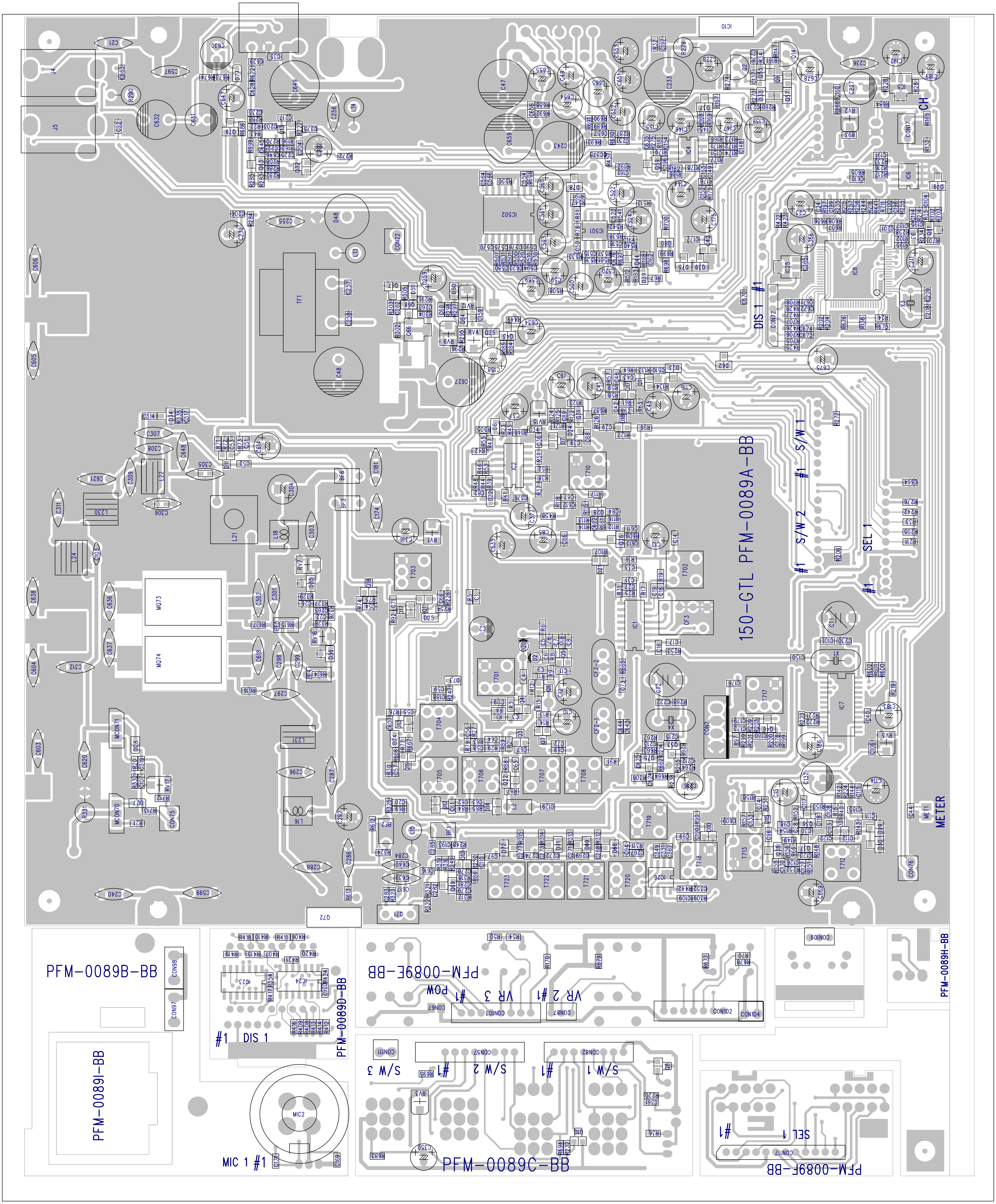
PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	PIN # 1-4 GROUND	V	0	0	0
5	RX/TX	mV	36	36	36
6	RX/TX	V	4.9	4.9	4.9
7	GROUND	V	0	0	0
8	RX/TX	V	5	5	5

IC 2 (IL324)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX MODE LEVEL AT 100µV	V	0.04	2.38	2.38
	RX MODE LEVEL AT 200µV	V	0.04	2.52	2.52
	RX MODE LEVEL AT 50µV	V	0.04	2.24	2.24
2	RX MODE LEVEL AT 100µV	V	0.04	1.18	1.18
	RX MODE LEVEL AT 200µV	V	0.04	1.25	1.25
	RX MODE LEVEL AT 50µV	V	0.04	0.94	0.94
3	RX MODE LEVEL AT 100µV	V	0.04	1.18	1.18
	RX MODE LEVEL AT 200µV	V	0.04	1.25	1.25
	RX MODE LEVEL AT 50µV	V	0.04	1.1	1.1
4	LEVEL AT -107dBm	V	0	7.86	7.86
	LEVEL AT -87dBm	V	0	7.82	7.82
	LEVEL AT -47dBm	V	0	7.77	7.77
	LEVEL AT -27dBm	V	0	7.76	7.76
	LEVEL AT 0dBm	V	0	7.72	7.72
5	PIN # 5-7 NO CONNECTION		N.C.	N.C.	N.C.
8	SQ. MIN AT -47dBm	V	0.19	0	0
	SQ. MAX. AT -47dBm	V	0.35	0	0
	SQ. MAX. AT -52dBm	V	0.35	6.06	6.06
9	SQ. MIN AT -47dBm	V	0.81	4.51	4.51
	SQ. MAX. AT -47dBm	V	0.81	4.51	4.51
	SQ. MAX. AT -52dBm	V	0.81	4.39	4.39
10	SQ. MIN AT -47dBm	V	0.61	0.61	0.61
	SQ. MAX. AT -47dBm	V	4.38	4.38	4.38
	SQ. MAX. AT -52dBm	V	4.38	4.45	4.45
11	GROUND	V	0	0	0
12	LEVEL AT -107dBm	V	0.1	0.38	0.38
	LEVEL AT -87dBm	V	0.1	1.53	1.53
	LEVEL AT -47dBm	V	0.1	2.28	2.28
	LEVEL AT -27dBm	V	0.1	2.44	2.44
	LEVEL AT 0dBm	V	0.1	4.64	4.64
13	LEVEL AT -107dBm	V	0.16	0.38	0.38
	LEVEL AT -87dBm	V	0.16	1.48	1.48
	LEVEL AT -47dBm	V	0.16	2.23	2.23
	LEVEL AT -27dBm	V	0.16	2.38	2.38
	LEVEL AT 0dBm	V	0.16	2.84	2.84
14	LEVEL AT -107dBm	V	0.37	0.85	0.85
	LEVEL AT -87dBm	V	0.37	3.38	3.38
	LEVEL AT -47dBm	V	0.37	4.7	4.7
	LEVEL AT -27dBm	V	0.37	5.4	5.4
	LEVEL AT 0dBm	V	0.37	6.3	6.3

IC 1 (UTC3361)

PIN NO.	SWITCH CONDITION	UNIT	PA	AM	FM
1	RX OPERATION AT -47dBm	V	0	4.85	4.85
2	RX OPERATION AT -47dBm	V	-.16	4.78	4.78
3	RX OPERATION AT -47dBm	V	-.16	4.5	4.5
4	RX OPERATION AT -47dBm	V	-.16	4.9	4.9
5	RX OPERATION AT -47dBm	V	0.04	3.66	3.66
6	RX OPERATION AT -47dBm	V	0.04	3.66	3.66
7	RX OPERATION AT -47dBm	V	0.02	3.66	3.66
8	RX OPERATION AT -47dBm	V	-.17	4.9	4.9
9	RX OPERATION AT -47dBm	V	0.02	2.15	2.15
10	PIN # 10- 14 NO CONNECTION		N.C.	N.C.	N.C.
15	GROUND	V	0	0	0
16	RX OPERATION AT -47dBm	V	-.03	1.72	1.71


150-GTL PFM-0089A-BB
CH
DIS 1 #1
S/W 1 #1
S/W 2 #1
SEL 1 #1
METER
PFM-0089B-BB
#1 DIS 1
PFM-0089D-BB
PFM-0089E-BB
POW
#1 VR 3
#1 VR 2
PFM-0089H-BB
PFM-0089I-BB
MIC 1 #1
S/W 3
#1 S/W 2
#1 S/W 1
PFM-0089C-BB
#1 SEL 1
PFM-0089F-BB

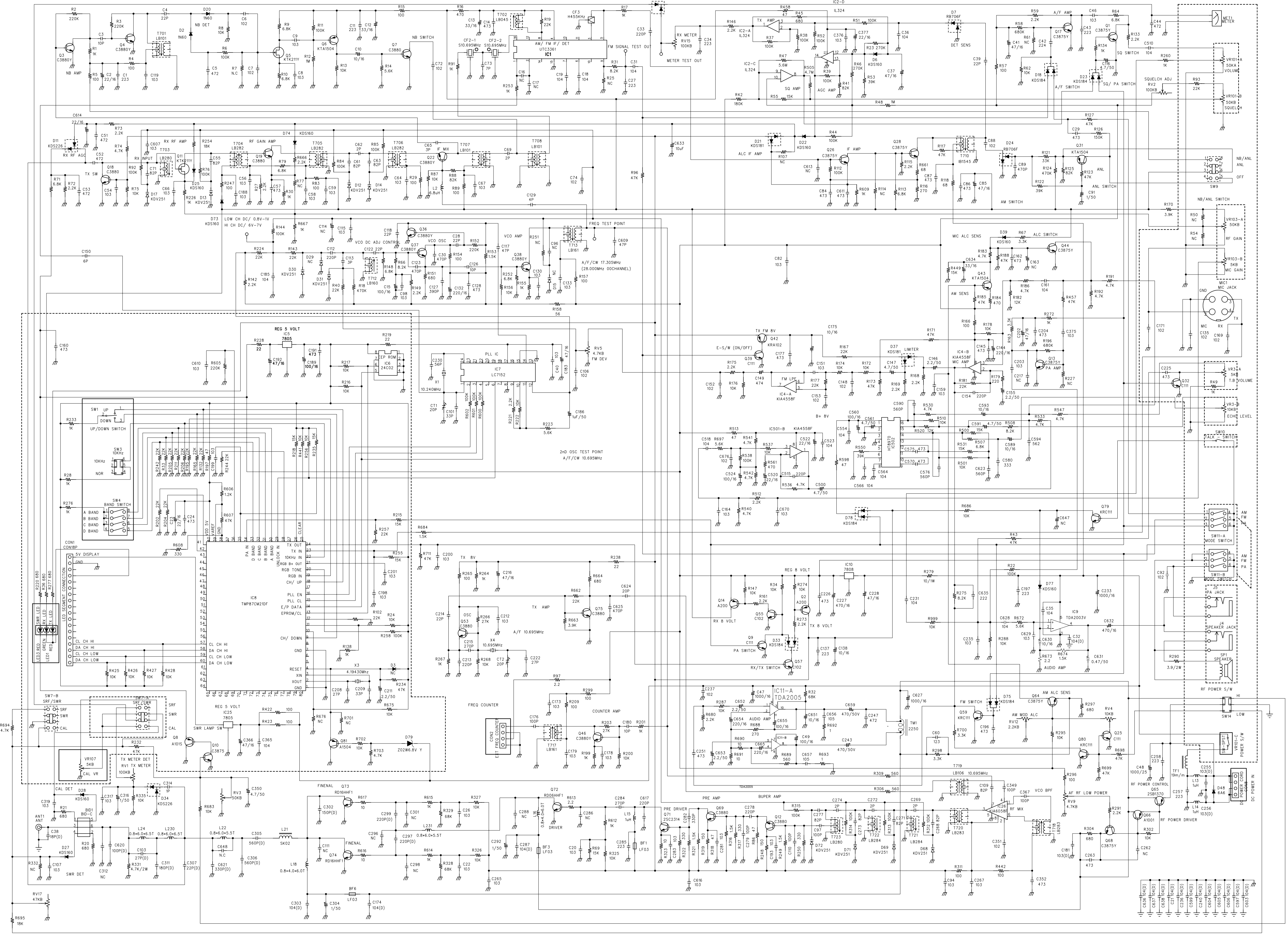
150GTL & 200GTL Parts List

COBRA P/N	MODEL	DESCRIPTION	CIRCUIT SYMBOL
010-001	150, 200	Bracket, mounting	
010-002	150	Capacitor, trimmer, 20pF, 150gtl	CT1,2
010-003	200	Choke, 4.7μH, 200gtl	L9,11
010-004	150	Choke, 6.8μH, 150gtl	L2
010-005	150, 200	Choke, power input	TF1
010-006	150, 200	Coil, 1μH	150GTL: L13,14,15 200GTL: L2,13
010-007	150, 200	Coil, adjustable	L21
010-008	150, 200	Coil, IFT	T702
010-009	150, 200	Coil, IFT	T701,707,708
010-010	150, 200	Coil, IFT	T719
010-011	150, 200	Coil, IFT	T712
010-012	150, 200	Coil, IFT	150GTL: T713,717 200GTL: T713
010-013	150, 200	Coil, IFT	T703,723
010-014	150, 200	Coil, IFT	T704,705,706
010-015	150, 200	Coil, IFT	T718,720
010-016	150, 200	Coil, IFT	T721,722
010-017	150	Coil, IFT, 150gtl	T710
010-018	200	Coil, IFT, 200gtl	T710
010-019	200	Coil, IFT, 200gtl	T711
010-020	200	Coil, IFT, 200gtl	T715,716
010-021	200	Coil, IFT, 200gtl	T714
010-022	150	Connector assembly, frequency counter, 150gtl	
010-023	150, 200	Connector, antenna	ANT1
010-024	150, 200	Connector, external speaker	150GTL: J4,5 200GTL: J2,3
010-025	150, 200	Connector, microphone	
010-026	150	Cover assembly, bottom, 150gtl	
010-027	200	Cover assembly, bottom, 200gtl	
010-028	150	Cover assembly, top, 150gtl	
010-029	200	Cover assembly, top, 200gtl	
010-030	150	Crystal, 10.24MHz, 150gtl	X1
010-031	200	Crystal, 10.24MHz, 200gtl	X2
010-032	150	Crystal, 10.695MHz, 150gtl	X4
010-033	200	Crystal, 10.6975MHz, 200gtl	X4
010-034	150, 200	Crystal, 4.194304MHz	X3
010-035	150, 200	Diode, 1N60P	150GTL: D2,20 200GTL: D2,78
010-036	150, 200	Diode, 6A6 (6A, 600V)	D48
010-037	200	Diode, band switch, KDS114, 200gtl	D49
010-038	150, 200	Diode, chip, 6.8V zener	150GTL: D79 200GTL: D83
010-039	150, 200	Diode, chip, KDS160	150GTL: D6,22,25,27,28,39,73,77,74 200GTL: D1,6,8,19,20,22,26,27,28,30,41,45,50,51,54,60,63,79,
010-040	150, 200	Diode, chip, KDS181S	150GTL: D21,37 200GTL: D21,37,46
010-041	150, 200	Diode, chip, KDS184S	150GTL: D18,23,33,62,75,78 200GTL: D4,5,9,16,18,33,39,42,43,44,47,52,55,58,80,81
010-042	150, 200	Diode, chip, KDS226	150GTL: D11,34 200GTL: D11,34,38
010-043	150, 200	Diode, chip, varicap, KDV251S-C-RTK	150GTL: D12,13,14,17,30,31,68,69,71,72 200GTL: D10,12,13,14,17,29,31,68,69,71,72
010-044	150, 200	Diode, schottky, RB706F	D7,24
010-045	200	Diode, varicap, KDV350E, 200gtl	D74
010-046	150	Escutcheon assembly, 150gtl	
010-047	200	Escutcheon assembly, 200gtl	

010-048	150, 200	Filter, ceramic, 455KHz	CF3
010-049	150	Heat sink, 150gtl	
010-050	200	Heat sink, 200gtl	
307-331-9-001	200	IC, audio amp, KIA7217AP, 200gtl	IC11
010-051	150	IC, audio amp, TDA2003V, 150gtl	IC9
010-052	150	IC, audio amp, TDA2005, 150gtl	IC11
010-053	150, 200	IC, bipolar, KIA4558F	IC4,501
010-054	150, 200	IC, bipolar, KIA6058F	IC26
010-055	150	IC, CPU, 150gtl	IC8
010-056	200	IC, CPU, 200gtl	IC8
010-057	200	IC, double balanced mod, NJM1496, 200gtl	IC3
010-058	150, 200	IC, echo, HT8970	IC502
010-059	150, 200	IC, EEPROM, HT24LC02	IC6
010-060	150, 200	IC, FM IF, UTC3361B	IC1
010-061	150, 200	IC, IN74HC164AD	150GTL: IC9,12 200GTL: IC18,24
010-062	150, 200	IC, OP AMP, IL324D	IC2
010-063	150, 200	IC, PLL, LC7152	IC7
010-064	150, 200	IC, regulator, KIA7808AP/API	IC10
010-065	150, 200	IC, regulator, KIA78L05F	IC5,25
010-066	200	IC, switch, IW4066BD, 200gtl	IC503
010-067	150, 200	Knob, channel	
010-068	200	Knob, pushbutton, DIM / SWR, 200gtl	
010-069	200	Knob, pushbutton, NB / HI PWR / R BEEP, 200gtl	
010-070	150, 200	Knob, volume (inner)	
010-071	150, 200	Knob, volume (outer)	
010-072	150, 200	Knobe, mode (PA-AM-FM)	
010-073	150, 200	Lamp, meter	LED2
010-074	150, 200	LED, ANT light	LED3
010-075	150, 200	LED, channel display	DIS1, DIS7
010-076	200	LED, frequency display, 200gtl	DIS1,2,3,4,5,6
010-077	150, 200	LED, RX / TX	LED1
010-078	150	MCF, 10.695MHz, 150gtl	
010-079	200	MCF, 10.695MHz, 200gtl	CF2
010-080	200	MCF, 10.695MHz, 200gtl	CF4
010-081	150, 200	Meter, analog	MET1
010-082	150	Pot, DIM / SWR CAL, 150gtl	VR107
010-083	200	Pot, ECHO / SWR CAL, 200gtl	VR4
010-084	150, 200	Pot, MIC GAIN / RF GAIN	150GTL: VR103 200GTL: VR103,105
010-085	150	Pot, TB / ECHO, 150gtl	VR3
010-086	150, 200	Pot, volume / squelch	VR101
010-087	150	Power cord assembly with fuse holder, 150gtl	
010-088	200	Power cord assembly with fuse holder, 200gtl	
010-089	150	Power cord pigtail assembly, 150gtl	CON8
010-090	200	Power cord pigtail assembly, 200gtl	
010-091	150, 200	Power supply assembly, EL	
010-092	200	Relay, 200gtl	RL1
010-093	150	Resistor, 10ohm 1W 5%, 150gtl	R279
010-094	200	Resistor, 120ohm 2W 5%, 200gtl	R346,355,356
010-095	150, 200	Resistor, 3.9ohm 2W 5%	R290
010-096	150, 200	Resistor, 4.7K 2W 5%	R331
010-097	150, 200	Resistor, trimmer, 100K	RV1,2,15
010-098	150, 200	Resistor, trimmer, 10K	150GTL: RV4 200GTL: RV6,14
010-099	200	Resistor, trimmer, 1K, 200gtl	RV8,20
010-100	150, 200	Resistor, trimmer, 2.2K	150GTL: RV12 200GTL: RV5,12
010-101	200	Resistor, trimmer, 22K, 200gtl	RV3,23

010-102	150, 200	Resistor, trimmer, 4.7K	150GTL: RV5,9 200GTL: RV7,9
010-103	200	Resistor, trimmer, 470ohm, 200gtl	RV19
010-104	150, 200	Resistor, trimmer, 47K	150GTL: RV3,17 200GTL: RV4,21
010-105	150, 200	Screw, case	
010-106	150, 200	Speaker	SP1
010-107	150	Strain relief, power cord, 150gtl	
010-108	200	Strain relief, power cord, 200gtl	
010-109	150, 200	Switch, band (A-B-C-D)	SW4
010-110	150, 200	Switch, channel	SW1
010-111	200	Switch, mode (CW-FM-AM-USB-LSB), 200gtl	SW12
010-112	150	Switch, mode (PA-AM-FM), 150gtl	SW11
010-113	200	Switch, push, DIM/SWR, 200gtl	SW17
010-114	200	Switch, push, NB, PWR, R BEEP, 10KHz, SWR-S/RF, 200	SW2,3,5,8,14
010-115	150	Switch, slide (RF Power, 10KHz), 150gtl	SW3,14
010-116	150	Switch, slide (S/RF, NB/ANL), 150gtl	SW7,9
010-117	150, 200	Thumbscrew, for mounting radio to bracket	
010-118	150	Transformer, audio, 150gtl	
172-062-9-001	200	Transistor, 2SC2078, 200gtl	Q72
010-119	200	Transistor, 2SC2290A, 200gtl	Q35,40
010-120	150, 200	Transistor, 2SC2314	Q71
010-121	150	Transistor, driver, RD06HHF1 (30MHz, 6W), 150gtl	Q72
010-122	150, 200	Transistor, KRA101S	150GTL: Q8 200GTL: Q46
010-123	150, 200	Transistor, KRA102S	Q42
010-124	150	Transistor, KRC101S, 150gtl	Q33,59,67
010-125	150, 200	Transistor, KRC102S	150GTL: Q55,57 200GTL: Q15,34,41,55,57
010-126	150, 200	Transistor, KRC111S	150GTL: Q9,25,32,39,59,79,80 200GTL: Q9,13,16,20,29,32,39,45,47,48,50,77-81,84,85
010-127	150, 200	Transistor, KTA1001	Q66
010-128	150, 200	Transistor, KTA1504GR	150GTL: Q6,31,43,81 200GTL: Q6,31,43,83
010-129	150, 200	Transistor, KTB1370	Q65
010-130	150, 200	Transistor, KTC3875Y	150GTL: Q1,10,13,17,26,28,44,64,68 200GTL: Q1,8,17,44,49,63,64,68,75
010-131	150, 200	Transistor, KTC3880S-Y	150GTL: Q3,4,7,12,18,19,22,36,37,38,46,55,69,75 200GTL: Q3,4,7,10,12,18,19,21,22,23,25,26,27,28,30,36,37,38,53,69
010-132	150, 200	Transistor, PNP, KTA200	Q2,14
010-133	150, 200	Transistor, RD16HHF1 (30MHz, 16W)	150GTL: Q73,74 200GTL: Q74
010-134	150, 200	Transistor., KTK211Y	Q5,11
010-135	150, 200	Washer, rubber (for thumb screws)	

MODEL	150 GTL	REV DATE	2005. 8. 3
E.C.O NO. ELEC-0508-02			



LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q18	C3880Y	RX STANDBY CONDITION	B	V	0	0	0
			E	V	0	0	0
			C	V	0	0	0
Q11	KTK211Y	RX LEVEL AT -107dBm	G	V	0	0	0
			D	V	0	0.73	0.73
			S	V	0	7.2	7.2
		RX LEVEL AT -47dBm	G	V	0	0	0
			D	V	0	0.78	0.78
			S	V	0	7.2	7.2
		RX LEVEL AT 0dBm	G	V	0	0	0
			D	V	0.16	0.79	0.79
			S	V	0	7.2	7.2
Q19	C3880Y	RX	B	V	-34.7mV	1.9	1.9
			E	V	.3mV	1.2	1.2
			C	V	-144mV	7.7	7.7
Q22	C3880Y	RX	B	V	-15.5mV	0.77	0.77
			E	mV	0	163.6	163.7
			C	V	-144.4mV	7.7	7.7
Q3	C3880Y	NB SW. OFF	B	mV	27.7	28.4	28.7
			E	V	0	0	0
			C	V	0.4	0.4	0.4
		NB SW. ON	B	V	-146.5mV	0.722	0.72
			E	V	0	0	0
			C	V	-146	4.5	4.5
Q4	C3880Y	NB SW. OFF	B	V	0.34	0.33	0.32
			E	V	0	0	0
			C	V	0.3	0.3	0.3
		NB SW. ON	B	V	-.13	0.72	0.72
			E	V	0	0	0
			C	V	0.3	0.3	0.3
Q5	KTK2IIY	RX	G	V	0	0	0
			D	V	-72mV	0.88	0.88
			S	V	0.74	6.9	6.9
Q6	KTA1504	RX	B	V	-130mV	7.2	7.2
			E	V	145mV	7.8	7.8
			C	V	0	2.9	2.9
Q36	C3880Y	RX/TX MODE	B	V	0.714	0.714	0.714
			E	V	0	0	0
			C	V	4.15	4.15	4.15
Q37	C3880Y	RX/TX MODE	B	V	2.9	2.9	2.9
			E	V	2.2	2.2	2.2
			C	V	7.1	7.1	7.1
Q38	C3880Y	RX/TX MODE	B	V	3	3	3
			E	V	2.3	2.3	2.3
			C	V	7.67	7.67	7.67

LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q26	C3875Y	RX/TX MODE	B	V	.4mV	0.708	0.708
			E	mV	0	136	136
			C	V	-034.8mV	1.6	1.6
Q28	C3875Y	RX MODE	B	V	-034mV	1.6	1.6
			E	V	0	1	1
			C	V	13.6	13.4	13.4
Q17	C3875Y	RX MODE	B	V	0.64	0.64	0.64
			E	V	0	0	0
			C	V	4.2	4.2	4.2
Q1	C3875Y	RX MODE	B	mV	.77V	2	2
			E	V	0	0	0
			C	V	0.007	0.023	0.026
Q42	KRA102	RX MODE	B	mV	0	0.2	0.29
			E	V	0	0	0
			C	mV	160	158	7.5V
		TX MODE	B	V	0	7.5	5.2mV
			E	V	0	7.5	7.5
			C	mV	160	158	7.5V
Q39	C111	TX MODE	B	V	0.03	0.05	7.9
			E	V	0	0	0
			C	V	0	7.5	7.5
Q64	C3875Y	RX MODE	B	V	0.84	0.84	0.84
			E	V	2.35	2.35	2.35
			C	V	7.9	7.9	7.9
		TX MODE	B	V	0.84	0.84	0.84
			E	V	2.35	2.01	2.05
			C	V	7.9	7.9	7.9
Q80	KRC111	RF PWR. SET TO HI PWR.	B	V	0	0	0
			E	V	0	0	0
			C	V	0	4	0
		RF PWR. SET TO LO PWR.	B	V	1.7	1.7	1.7
			E	V	0	0	0
			C	V	0	0	0
Q25	C111	RF PWR. SET TO HI PWR.	B	V	0	0	0
			E	V	0	0	0
			C	V	0.84	0.84	0.84
		RF PWR. SET TO LO PWR.	B	V	1.7	1.7	1.7
			E	V	0	0	0
			C	V	0	0	0
Q65	2SC1370	RF PWR SW. SET TO HI PWR	B	V	13.5	13.5	13.5
			E	V	13.8	13.6	13.6
			C	V	13.8	13.7	13.7
		RF PWR SW. SET TO LO PWR	B	V	13.3	13	13
			E	V	13.8	13.7	13.7
			C	V	6.85	6.75	6.75
		STANDBY RF PWR SW. AT LO PWR	B	V	13.3	13.3	13.3
			E	V	13.8	13.8	13.8
			C	V	6.85	6.85	6.85
		STANDBY RF PWR SW. AT HI PWR	B	V	13.5	13.5	13.5
			E	V	13.8	13.8	13.8
			C	V	13.8	13.8	13.8

LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q66	13.2	STANDBY RF PWR SW. AT LO PWR	B	V	13.2	13.2	13.2
			E	V	13.3	13.3	13.3
			C	V	6.85	6.85	6.85
		STANDBY RF PWR SW. AT HI PWR	B	V	13.5	13.5	13.5
			E	V	13.5	13.5	13.5
			C	V	13.8	13.8	13.8
		RF PWR SW. SET TO HI PWR	B	V	13.5	13.2	13.2
			E	V	13.5	13.2	13.2
			C	V	13.8	13.4	13.4
		RF PWR SW. SET TO LO PWR	B	V	13.2	12.5	12.5
			E	V	13.3	13	13
			C	V	6.85	6.76	6.76
Q68	C3875Y	STANDBY RF PWR SW. AT LO PWR	B	V	7.4	7.4	7.4
			E	V	6.9	6.9	6.9
			C	V	13.2	13.2	13.2
		STANDBY RF PWR SW. AT HI PWR	B	V	7.4	7.4	7.4
			E	V	13.8	13.8	13.8
			C	V	13.5	13.5	13.5
		RF PWR SW. SET TO HI PWR	B	V	7.4	7.4	7.4
			E	V	13.8	13.4	13.4
			C	V	13.5	13.4	13.16
		RF PWR SW. SET TO LO PWR	B	V	7.4	7.4	7.4
			E	V	6.9	6.8	6.8
			C	V	13.2	12.45	12.45
Q12	C3880Y	TX MODE BOTH HI & LO PWR	B	V	0	1.32	1.32
			E	V	0	0.57	0.57
			C	V	0	5.64	5.64
Q69	C3880Y	TX MODE BOTH HI & LO PWR	B	V	0	1.33	1.33
			E	V	0	0.58	0.58
			C	V	0	5.64	5.64
Q71	2SC2314	TX MODE BOTH HI & LO PWR	B	V	0	1.28	1.28
			E	V	0	0.61	0.61
			C	V	0	7.52	7.52
Q72	RDO6HHF1	STANDBY RF PWR SW. AT LO PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		STANDBY RF PWR SW. AT HI PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	6.85	6.85	6.85
		RF PWR SW. SET TO HI PWR	B	V	0	4.47	4.47
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		RF PWR SW. SET TO LO PWR	B	V	0	4.47	4.47
			E	V	0	0	0
			C	V	6.85	6.75	6.75
Q20	A200	RX	B	V	7.9	7.9	7.9
			E	V	7.9	7.9	7.9
			C	V	0	0	0
		TX	B	V	0	7.12	7.12
			E	V	7.9	7.9	7.9
			C	V	0	7.6	7.6

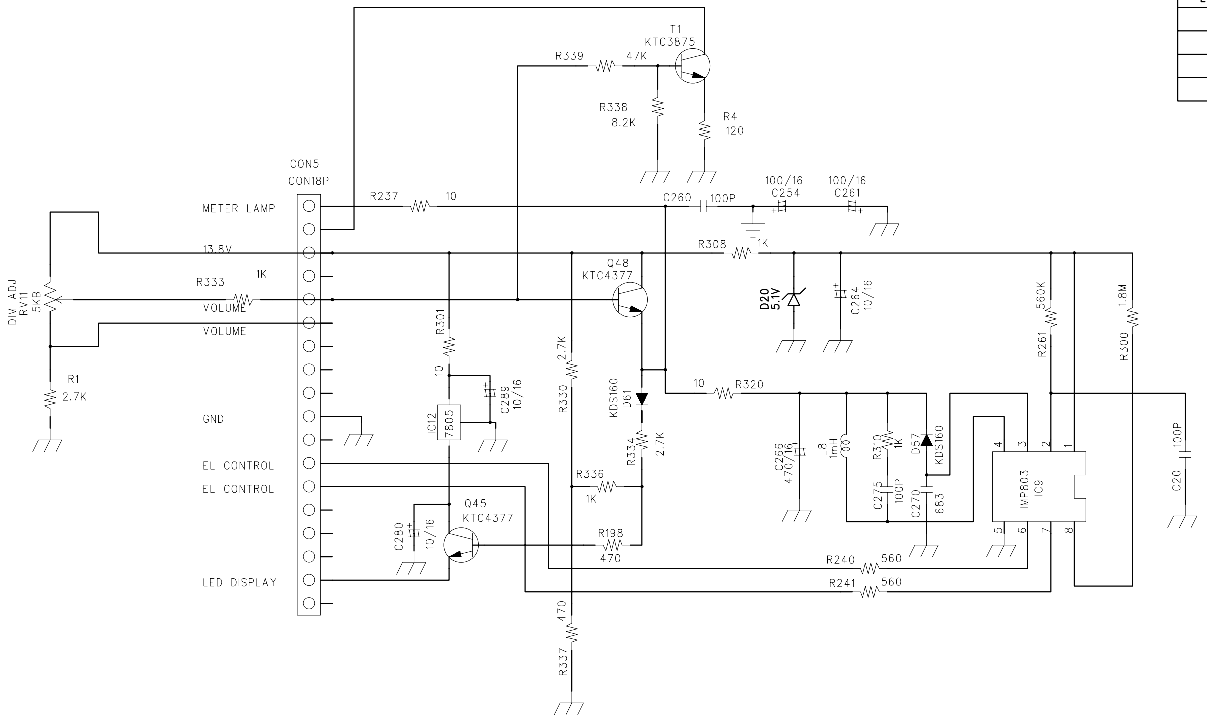
LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q9	C111	RX	B	V	7.9	0	0
			E	V	0	0	0
			C	V	0	4.4	4.4
		TX	B	V	7.9	0	0
			E	V	0	0	0
			C	V	0	0.61	0.61
Q57	C102	RX	B	V	0	0	0
			E	V	0	0	0
			C	V	7.7	7.7	7.7
		TX	B	V	0	4.8	4.8
			E	V	0	0	0
			C	V	7.7	0.02	0.02
Q75	C3880Y	TX	B	V	0	0.64	0.64
			E	V	0	0	0
			C	V	0	4.5	4.5
Q53	C3880Y	TX	B	V	0	1.9	1.9
			E	V	0	1.2	1.2
			C	V	0	7.1	7.1
Q46	C3880Y	RX	B	V	1.7	1.7	1.7
			E	V	1.3	1.3	1.3
			C	V	7.6	7.6	7.6
		TX	B	V	1.7	1.8	1.8
			E	V	1.3	1.3	1.3
			C	V	7.6	7.6	7.6
Q59	KRC111	TX/RX	B	V	7.4	7.4	7.4
			E	V	0	0	0
			C	V	0	4	0
Q44	C3880Y	TX MODE / MIC GAIN MINIMUM	B	V	0	0	0
			E	V	0	0	0
			C	V	0	0	0
		TX MODE / MIC GAIN MAX.	B	V	0	0.56	0
			E	V	0	0	0
			C	V	0	0	0
		STANDBY	B	V	0	0.72	0.72
			E	V	0	0	0
			C	V	0	4.5	4.5
Q43	KTA1504	RX	B	V	7.9	7.9	7.9
			E	V	7.9	7.9	7.9
			C	V	0	0.558	0.558
		TX	B	V	7.9	7.5	7.9
			E	V	7.9	7.9	7.9
			C	V	0	0.65	0
Q13	C3875Y	TX/RX	B	V	0.61	0	0
			E	V	0	0	0
			C	V	4.18	0	0
Q79	KRC111	TALKBACK SW. ON	B	V	7.95	7.95	7.95
			E	V	0	0	0
			C	V	0	0	0

LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q14	A200	RX	B	V	7.9	7.19	7.2
			E	V	7.95	7.95	7.95
			C	V	-0.15	7.9	7.9
		TX	B	V	7.9	7.9	7.9
			E	V	7.95	7.95	7.95
			C	V	0	-.14	-.14
Q55	C102	RX	B	V	0	4.36	4.36
			E	V	0	0	0
			C	V	7.9	0.02	0.02
		TX	B	V	0	0.59	0.59
			E	V	0	0	0
			C	V	7.9	7.9	7.9
Q73	RD16HHF1	STANDBY MODE SW. AT HI PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		STANDBY MODE SW. AT LO PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	6.85	6.85	6.85
		TX MODE AT HI PWR	B	V	0	6.57	6.57
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		TX MODE AT LO PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	6.85	6.85	6.85
Q74	RD16HHF1	STANDBY MODE SW. AT HI PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		STANDBY MODE SW. AT LO PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	6.85	6.85	6.85
		TX MODE AT HI PWR	B	V	0	6.57	6.57
			E	V	0	0	0
			C	V	13.8	13.8	13.8
		TX MODE AT LO PWR	B	V	0	0	0
			E	V	0	0	0
			C	V	6.85	6.85	6.85
Q81	A1504	RX	B	V	6.91	6.91	6.91
			E	V	5	5	5
			C	V	0	0	0
		TX	B	V	6.91	6.82	6.82
			E	V	5	5	5
			C	V	0	0	0
Q81	A1015	TX MODE W/ ANTENNA	B	V	3.7	3.7	3.7
			E	V	3.7	3.7	3.7
			C	V	0	0	0
		TX MODE W/O ANTENNA SW.SET TO SWR FUNC.	B	V	3.7	0.03	0.03
			E	V	3.7	1.4	1.4
			C	V	0	0	0
		TX MODE W/O ANTENNA SW.SET TO CAL FUNC.	B	V	3.7	3.7	3.7
			E	V	3.7	3.7	3.7
			C	V	0	0	0

LOCATION	VALUE	SWITCH CONDITION		UNIT	PA	AM	FM
Q10	C3875Y	TX MODE W/ ANTENNA SW SET TO CAL FUNC.	B	V	0	0	0
			E	V	0	0	0
			C	V	3.7	3.7	3.7
		TX MODE W/O ANTENNA SW.SET TO SWR FUNC.	B	V	0	0.32	0.32
			E	V	0	0	0
			C	V	3.7	3.7	3.7
		TX MODE W/O ANTENNA SW.SET TO SWR FUNC.	B	V	0	0.59	0.59
			E	V	0	0	0
			C	V	0.03	0.03	0.03

REVISION RECORD

LTR	ECO NO:	APPROVED:	DATE:



DRAWN:	DATED:
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

COMPANY:

TITLE:

CODE:	SIZE:	DRAWING NO:	REV:

SCALE:
SHEET: OF